mode are at least several times[illegible]r in both the transverse and lateral dire[illegible] than the optical wavelength inside the dielectric medium of the waveguide.

57. The device of claim 56 further comprising second and third heightened regions, which extend parallel to and are separated from said first heightened region along the longitudinal axis, and include absorptive regions to provide loss for higher order spatial modes.

58. The device of claim 56, wherein loss in said first and second lateral regions is generated by bombardment of all or certain layers with protons or other damage-inducing ions to provide additional loss for higher order spatial modes.

59. The device of claim 56, wherein loss in said first and second lateral regions is generated by roughening the sidewalls of the device to further suppress higher order spatial modes.

60. The device of claim 56, wherein loss in said first and second lateral regions is generated by doping said regions to provide large free-carrier absorption which adds additional loss for higher order spatial modes.

61. The device of claim 56, wherein the cross-sectional dimensions of the lowest order spatial mode are at least an order of magnitude larger than the optical wavelength inside the dielectric medium of the waveguide.

62. The device of claim 57, wherein the cross-sectional dimensions of the lowest order spatial mode are at least an order of magnitude larger than the optical wavelength inside the dielectric medium of the waveguide.

63. The device of claim 56, wherein the contours of constant optical intensity for the lowest order spatial mode supported within said waveguide are nearly circular.

64. The device of claim 56, wherein the contours of constant optical intensity for the lowest order spatial mode supported within said waveguide have an approximately elliptical shape with a small aspect ratio.

65. The device of claim 57, wherein the contours of constant optical intensity for the lowest order spatial mode supported within said waveguide are nearly circular.

66. The device of claim 57, wherein the contours of constant optical intensity for the lowest order spatial mode supported within said waveguide have an approximately elliptical shape with a small aspect ratio.

67. The device of claim 57, wherein the first heightened region in the waveguide is defined by a region between two parallel etched channels in said layers, and wherein said second and third heightened regions are positioned outside the two parallel etched channels.

68. The device of claim 56, wherein a quantum well region provides gain.

69. The device of claim 56, wherein a quantum well region comprising one or more quantum wells, barrier layers and bounding layers provides gain.

70. The device of claim 56, wherein a strained-layer quantum well region provides gain.

71. The device of claim 56, wherein a strained-layer quantum well region comprising one or more quantum wells, barrier layers and bounding layers provides gain.

72. The device of claim 56, wherein a region containing quantum dots or quantum wires provides gain.

73. The device of claim 56 in which a region containing quantum dots or quantum wires inside one or more quantum well layers provides gain.

74. The device of claim 56, wherein gain is provided by a region containing one or more semiconductor layers.

75. The device of claim 57, wherein the regions between the first and second heightened regions and between the first and third heightened regions are filled with high resistivity material.

76. The device of claim 56, wherein said waveguide is comprised of a plurality of layers of semiconductor material with different optical indices.

77. The device of claim 76, wherein said plurality of layers of semiconductor material with different optical indices are made of III-V compound semiconductors.

78. The device of claim 76, wherein said plurality of layers of semiconductor material with different optical indices are made in the $In_xGa_{1-x}As_yP_{1-y}$ semiconductor system on an InP substrate.

79. The device of claim 76, wherein said plurality of layers of semiconductor material with different optical indices are made in the $Al_xGa_yIn_{1-x-y}As$ semiconductor system on an InP substrate.

80. The device of claim 76, wherein said plurality of layers of semiconductor material with different optical indices are made in a combination of the $Al_xGa_yIn_{1-x-y}As$ and $In_xGa_{1-x}As_yP_{1-y}$ semiconductor systems on an InP substrate.

81. The device of claim 76, wherein said plurality of layers of semiconductor material with different optical indices are made in the $Al_xGa_{1-x}As$ semiconductor system on a GaAs substrate.

82. The device of claim 76, wherein said plurality of layers of semiconductor material with

different optical indices are made in the $Al_xGa_yIn_{1-x-y}As$ semiconductor system on a GaAs substrate.

83. The device of claim 76, wherein said plurality of layers of semiconductor material with different optical indices are made in a combination of the $Al_xGa_{1-x}As_z$ and $In_xGa_{1-x}As$ semiconductor systems on a GaAs substrate.

84. The device of claim 76, wherein said plurality of layers of semiconductor material with different optical indices are made in a the $Ga_yIn_{1-y}As_zP_{1-z}$ semiconductor systems on a GaAs substrate.

85. The device of claim 76, wherein said plurality of layers of semiconductor material with different optical indices are made in a the $Al_xGa_yIn_{1-x-y}As_zP_{1-z}$ semiconductor systems on a GaAs substrate.

86. The device of claim 76, wherein said plurality of layers of semiconductor material with different optical indices are made in a combination of the $Al_xGa_yIn_{1-x-y}As_zP_{1-z}$ and $In_xGa_{1-x}As_yP_{1-y}$ semiconductor systems on a GaAs substrate.

87. The device of claim 76, wherein said plurality of layers of semiconductor material with different optical indices are made in the $Al_xGa_yIn_{1-x-y}As_zSb_{1-z}$ semiconductor system on an InP substrate.

88. The device of claim 76, wherein said plurality of layers of semiconductor material with different optical indices are made in a combination of the $Al_xGa_yIn_{1-x-y}As_zSb_{1-z}$ and $In_xGa_{1-x}As_yP_{1-y}$ semiconductor systems on an InP substrate.

89. The device of claim 76, wherein said plurality of layers of semiconductor material with different optical indices are made in the $Al_xGa_yIn_{1-x-y}As_zSb_{1-z}$ semiconductor system on a GaSb

substrate.

90. The device of claim 76, wherein said plurality of layers of semiconductor material with different optical indices are made in the $Al_xGa_yIn_{1-x-y}As_zSb_{1-z}$ semiconductor system on an InAs substrate.

91. The device of claim 76, wherein said plurality of layers of semiconductor material with different optical indices are made in the $Al_xGa_yIn_{1-x-y}N$ semiconductor system on a GaN substrate.

92. The device of claim 76, wherein said plurality of layers of semiconductor material with different optical indices are made in the $Al_xGa_yIn_{1-x-y}N$ semiconductor system on a sapphire substrate.

93. The device of claim 76, wherein said plurality of layers of semiconductor material with different optical indices are made in the $Al_xGa_yIn_{1-x-y}N$ semiconductor system on a SiC substrate.

94. The device of claim 76, wherein said plurality of layers of semiconductor material with different optical indices are made in a the $Al_xGa_yIn_{1-x-y}As_zN_{1-z}$ semiconductor systems on a GaAs substrate.

95. The device of claim 76 wherein said plurality of layers of semiconductor material with different optical indices are made of II-VI compound semiconductors.

96. The device of claim 76 wherein said plurality of layers of semiconductor material with different optical indices are made of IV-VI compound semiconductors.